MA Test Adapters for Condenser Microphones of the fet 80®-Series

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1) General

The MA test adapters are used to replace the capsule head of microphones during measurements on the amplifier. They prevent acoustic interferences which could be channeled through the capsule and yet have the capsule's impedance so that the amplifier can operate under its normal operating conditions.

2) What can be measured?

2.1 Supply voltage and current consumption, nominal voltages in the amplifier

2.2 Gain (at various frequencies)

2.3 Output range, i.e. input voltage for the maximally permissible harmonic distortion (total harmonic distortion = 0.5%)

2.4 Unweighted self noise voltage E_{unwtd} (µV) or self noise voltage level (dB re. 0.775 V)

2.5 Weighted self noise voltage E_{wtd} (µV) or self noise voltage level (dB re. 0.775 V)

2.6 Capsule polarization voltage

3) What aids and instruments are necessary?

The following instruments and aids are required if the amplifier data listed in 2) are to be determined:

3.1 Microphone power supply unit (e.g. N 452 i) with corresponding connecting cables

3.2 MA test adapter, to match the respective microphone type

3.3 Multimeter

3.4 AF generator 20-20,000 Hz; voltage output depending on the microphone type 0.3...9 V_{rms} (MA impedance $\geqq$ 600 ohms)

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3.5 Voltage meter for unweighted and weighted measurements in accordance with CCIR 468-1 (1976) or IEC 268-1 (flat RMS, weighted peak or weighted RMS)

3.6 Static or compensation voltmeter for measuring the polarization voltage of the capsule; depending on the microphone type ±50...+120 V

3.7 Linear test amplifier as the sensitivity of normal meters is insufficient for measuring the low self noise levels (depending on microphone type 1...5 µV: 40...60 dB pre-amplification required).

4) Which MA is required for which microphone?

The test adapters are identified by the letters "MA" and the number of the corresponding microphone; for example "MA 84" for the KM 84 microphone, etc. With the exception of the test adapter for KM 86 i, all MA's are suitable both for microphones with Switchcraft plugs (i version, e.g. KM 84 i) and for microphones with DIN plugs (e.g. KM 84).

If the test input is not found in the microphone (Mpb 1 sockets, Messrs. Hirschmann), it may be found in the test adapter as a two-pole socket (Lemo, type RA, size 0).

The required mating plugs for supplying the AF signal voltage are included with each test adapter.

Note:

You should never touch the contact insulating elements of the capsule with your fingers, nor should you touch the other extremely high-impedance parts in this area as even the slightest dirt and grease residues will reduce the insulation and cause noise.

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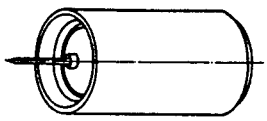
Test Adapters

4.1 KM 83 i/KM 84 i/KM 85 i:

The MA 84 test adapter consists of one part, has one measuring input and is screwed onto the microphone instead of the capsule.



MA 84

4.2 KMS 84 i/KMS 85 i:

MA 84, as described in 4.1.
With these microphones, the grille must first be unscrewed and, in the case of the KMS 84 i, this is done by turning the wire gauze part to the left. In the case of the KMS 85 i, four Philips screws on the bottom edge of the grille must be unscrewed, and in the case of older models, four set screws on the bottom edge of the grille must be screwed inwards towards the right. The basket can then be removed upwards and the MA 84 may be screwed on in place of the capsule.

4.3 KMR 82 i:

The MA 84/82 test adapter consists of two parts and comprises the MA 84 test adapter (refer to 4.1) and a housing tube into which the preamplifier of the shot gun microphone KMR 82 i can be alternately inserted. The MA 84 fits onto this tube with its thread.

The KMR 82 i preamplifier and its capsule may be pulled out of their tube after unscrewing the three Philips screws at the connector insert end. The preamplifier must be pulled out with great care since the capsule is embedded in an elastic sleeve. The elastic sleeve represents the actual capsule mount inside the tube and provides good protection against mechanical shock.

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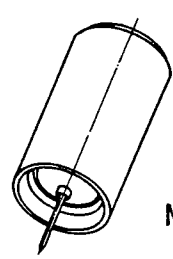
The insulating foil which protects the capsule against electrical shorts to the inner tube wall remains in the tube. When re-inserting the KMR 82 i preamplifier in the tube make sure that

(a) the capsule is properly inserted in the elastic sleeve;

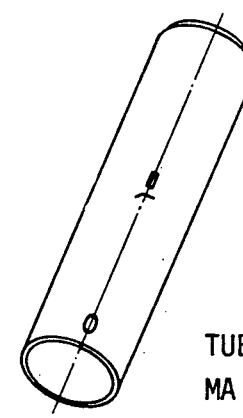
(b) neither the capsule nor parts of the preamplifier damage the insulating foil;

(c) that prior to re-inserting the preamp, the switch of the high-pass filter on the preamp is aligned with its slot in the tube.

Once the preamplifier has been removed, the capsule may be unscrewed, the preamplifier may be inserted from the rear into the replacement tube and secured with a screw. The MA 84 test adapter is screwed onto the front of the tube and an audio frequency voltage may be fed into the preamplifier through the adapter.



MA 84



TUBE FOR
MA 84/82

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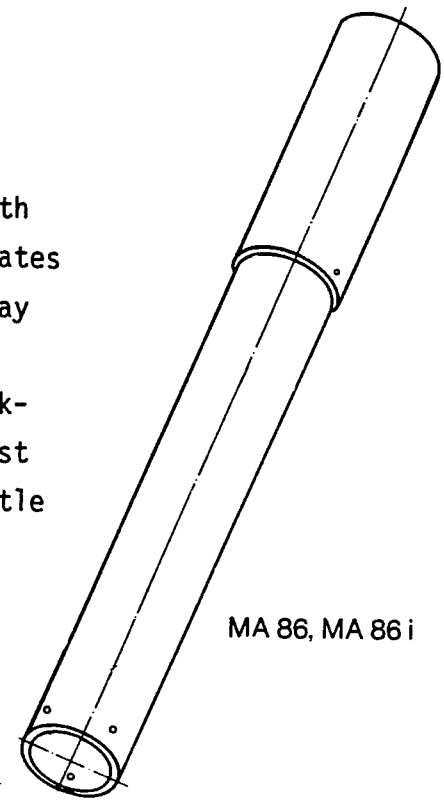
4.4 KM 86 i/KM 86:

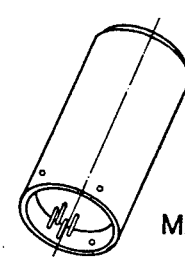
The MA 86 i or MA 86 test adapter consists of two parts and comprises a replacement capsule head with its input socket and a housing tube which accomodates the preamplifier to be tested. The preamplifier may be pulled out downwards after turning the three screws on the bottom of the housing inwards (clockwise) and can be inserted into the tube of the test adapter. Therefore, it is not necessary to dismantle the capsule head from the microphone. The MA 86 i and MA 86 test adapters only differ mechanically.



MA 86, MA 86 i

4.5 KM 88 i:

The MA 88 test adapter consists of one part, has a test input and is screwed on instead of the capsule head. In order to remove the capsule head, the three set screws in the housing tube must be turned inwards (clockwise). When placing the test adapter in position, ensure that the holes in the test adapter are flush with the set screws of the preamplifier housing, as the plug can also be inserted backwards.



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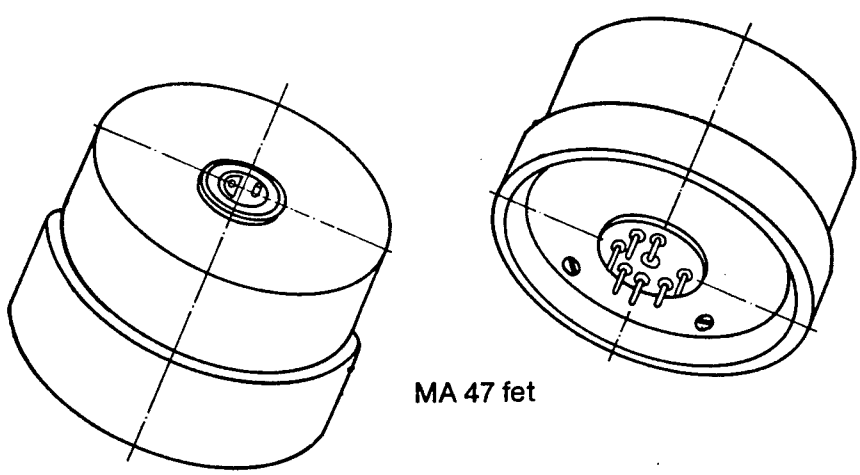
The unscrewed capsule must not be turned with respect to the capsule housing. The capsule housing and amplifier housing tube are correctly positioned with respect to each other when the three set screws in the housing tube, the holes in the capsule housing and the three screws in the capsule base piece line up.

4.6 U 47 fet i:

The MA 47 fet test adapter consists of one part, has a test input and is placed onto the microphone instead of the capsule head. This may be removed after unscrewing the Philips screws on its bottom edge.

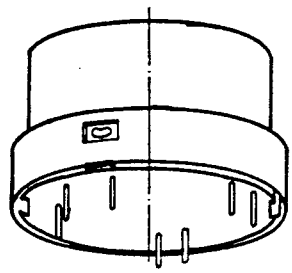


MA 47 fet

4.7 U 87 i:

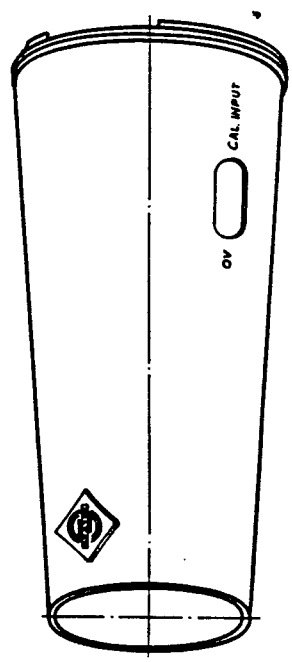
The MA 87 test adapter consists of two parts and comprises the replacement capsule head and a housing tube for the preamplifier. This contains an opening for the sockets of the test input on the preamplifier board and a slot to enable observation of the battery voltage meter.

The U 87 i may be dismantled after unscrewing the large bottom ring with nameplate, by turning it to the left. The conical housing tube may then be removed. The capsule grille and also the test adapter are held to the preamplifier body by two spring-loaded levers which may be depressed and pushed inwards with the thumb and index finger.



Test socket assignments:

black: zero potential;
red: to the capsule base-point.



MA 87

4.8 U 89 i:

In the case of the U 89 i microphone, the test voltage is applied to the base-point of the capsule itself. The housing tube may be pulled off downwards after turning the large bottom ring to the left.

Below and to the left of the polar pattern selector there are contact elements which are normally bridged. If the bridge is removed and an audio frequency ac voltage is applied to the contact elements, the feeding of the preamplifier input via the capsule capacitance will be the same as that of a corresponding alternating sound pressure impinging on the microphone. This enables the most important specifications of the microphone to be measured directly.

The lower pin is adjoined to zero potential, the upper pin or the contact sleeve, respectively, is adjoined to the capsule base-point.

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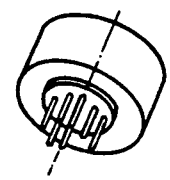
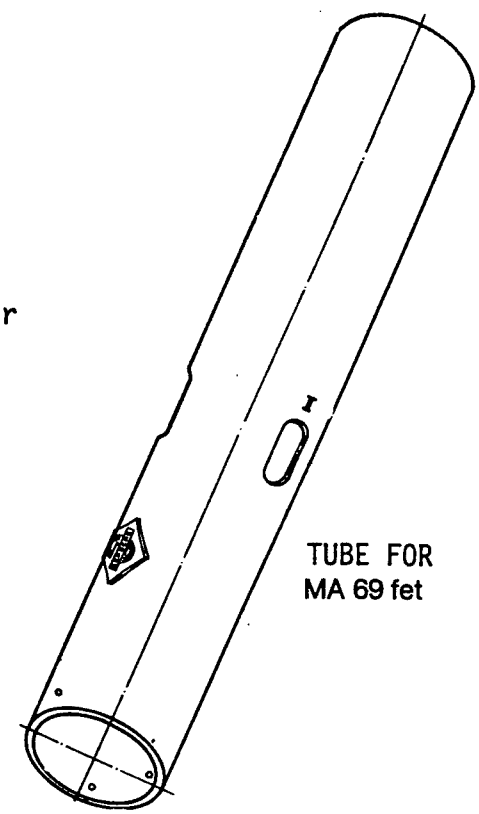
In order to measure the self-noise voltage, this microphone must be inserted into the sound-proof MPR microphone testing tube as it is not possible in this case to simulate the capsule by means of a fixed capacitance (refer to 5.3).



EK 69 fet

4.9 SM 69 fet:

The MA 69 fet test adapter consists of two parts and comprises the replacement capacitance unit EK 69 fet and a housing tube with two openings for the test inputs of the two preamplifiers. After removing the capsule head (remove three Philips screws on the bottom edge of the grille) and removing the preamplifier (screw three set screws at the bottom of the housing tube inwards), the replacement capacitance unit EK 69 fet is placed onto the preamplifier instead of the capsule and both are inserted into the housing tube which is closed at the top.



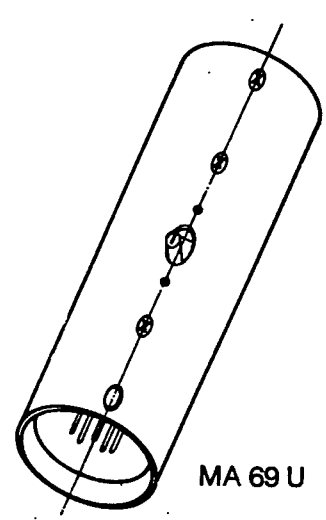
TUBE FOR MA 69 fet

Test socket assignments:

black: zero potential;
red: to the capsule base-point.

4.10 USM 69 i:

The MA 69 U test adapter consists of one part, has a switchable test input and is placed onto the preamplifier instead of the capsule. For this purpose, the three Philips screws on the bottom edge of the capsule head must be unscrewed. The slide switch in the MA 69 U permits optional



MA 69 U

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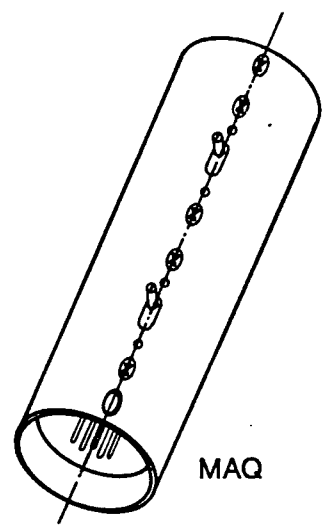
switching of the voltage at the test input to preamplifier I (yellow) or II (red) and is provided with the corresponding markings.

4.11 QM 69:

The MAQ test adapter consists of one part, has a switchable test input and is placed onto the pre-amplifier instead of the capsule. For this purpose, the three Philips screws on the bottom edge of capsule head must be unscrewed. The signal at the test input can be optionnally switched to one of the four amplifiers with the four slide switches in the MAQ. The general color markings are coded in accordance with DIN 45 597 and correspond to the color rings of the AC 16 cable.


MAQ

5) How should measurements be made?

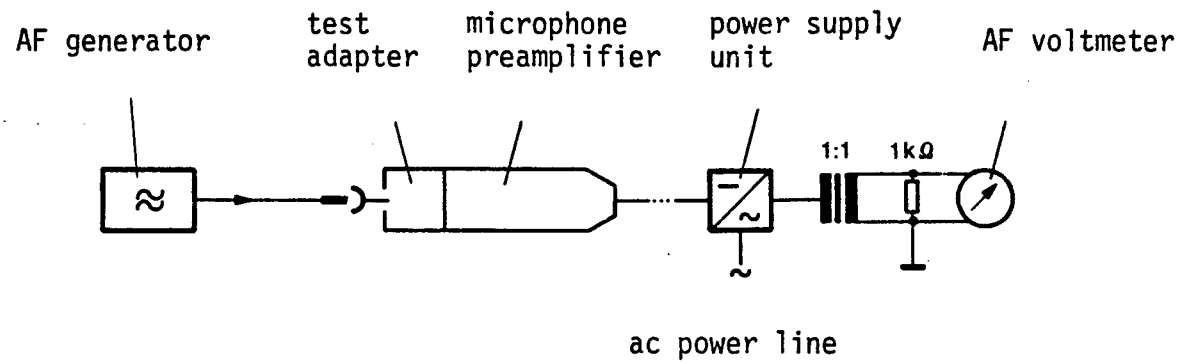
If the microphones have switches, they should be set as follows:

"without attenuation"
"without bass drop"
"omnidirectional" characteristic

In addition, the normal output impedance of 200 ohms or 150 ohms is assumed. For microphones switched to "50 ohms" or "PAD", output levels are reduced by 6 dB.

5.1 Voltage gain

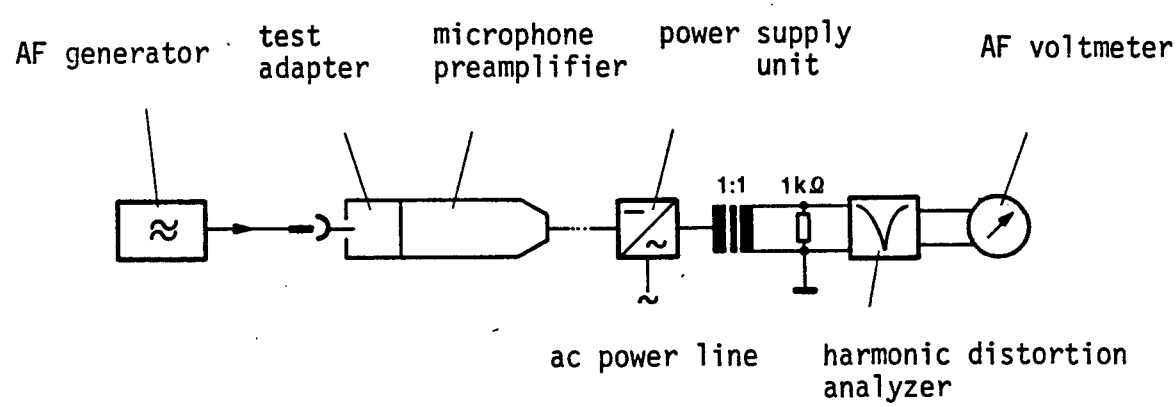
The gain is measured by comparing the ac voltage at the test input and the voltage at the output of the microphone preamplifier. The measurement frequency should be 1 kHz and the output should be terminated with 1 kohm.



The measurement can be repeated at several frequencies to check the frequency response of the preamplifier. It is usually sufficient to carry out measurements at 40 Hz, 1 kHz, and 16 kHz.

5.2 Output capability

The test set-up is the same but, in this case, the harmonic distortion measuring instrument is now connected to the output of the microphone preamplifier, if necessary via an isolation transformer. The input voltage of the microphone preamplifier is increased until the specified harmonic distortion is measured at the output.



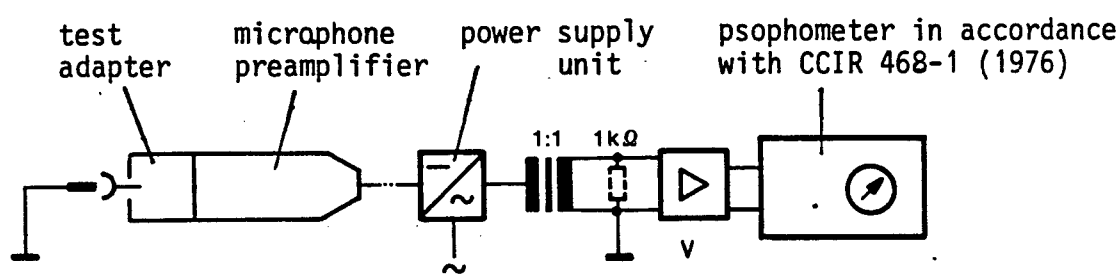
5.3 Self-noise level

Definition:
The self-noise level of a microphone is the noise level measured at the output when no sound is directed towards the microphone and when there is no external noise field.

The unweighted noise level is measured via a filter with a linear attenuation between 31.5 Hz and 20 kHz and the weighted noise level is measured with a special weighting filter in accordance with CCIR 468-1 (1976) or IEC 268-3, respectively (the filter used is to be specified).

The self-noise levels should be measured with the test input shorted. They may also be measured with the microphone capsule instead of a test adapter if the microphone is isolated acoustically. The MPR microphone test device, in which each microphone can be hooked, may be used for this purpose. It attenuates airborne and structure-borne noise by more than 40 dB.

TEST SET-UP:



V = linear test amplifier,
e.g. Neumann V 476 B

or correspondingly equipped voltmeter

If an amplifier with a balanced, ground-free input is used, there is no need for an isolation transformer ahead of the test instrument. For measurement, the test amplifier should be terminated with an impedance of 1 kohm. If necessary the input of the test amplifier should be suitably terminated.